

AMERICAN BEE JOURNAL.

EDITED AND PUBLISHED BY SAMUEL WAGNER, WASHINGTON, D. C.

VOL. III.

DECEMBER, 1867.

No. 6.

Parthenogenesis in the Honey Bee.

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[CONTINUED.]

It was ascertained anatomically by Made-moiselle Jurine, that the worker bees are nothing but female bees whose sexual organs are aborted. By careful dissection the ovarian tubes not perfectly developed may be exhibited in all workers, connected with an undeveloped oviduct. I have already shown in the year 1843, that in all workers there is connected with this undeveloped oviduct, an appendage which perfectly represents the seminal receptacle of queens. On this appendage I could discover the seminal duct, the seminal capsule, and the two appendicular glands, with their common efferent duct in the workers; but all these separate parts of the seminal receptacle were in a very undeveloped state.

In what follows I will endeavor to explain by what cause the ovarian tubes, which in the normally-formed workers always remain empty, may become exceptionally filled with eggs in certain workers. It is well known to apiarians that in hives which have suddenly lost their queen, the workers, if they wish to put themselves in possession of a new queen, select some worker-cells furnished with an egg or a young larva, and enlarge these into royal cells, (queen's cradles) and that they do not then bring up the larvæ which are excluded from the eggs already laid in these former worker-cells, or which were found in them already excluded in such cells, with the ordinary worker-food, but furnish them with royal-food, as indeed all the eggs deposited by a fertilized queen in worker-cells are of one kind, namely, female. But in order that the female sexual organs of such a larva may acquire their development, the larva must receive royal-food; if, on the contrary, the female sexual organs are to remain undeveloped for the advantage of the organs of the worker-bee destined for work, this object is attained by the administration of worker-food. I leave it undecided in what the distinction between worker and royal food consists; for the apiarians

have hitherto been at variance, as to whether the larvæ of workers and queens received the same food, but the latter in greater quantity; or whether the queen's food differs from that of the workers not only in its quantity, but also in its quality. From Leuckart's recent investigations, however, it appears that there is really a qualitative difference between the two kinds of food. The larvæ destined to become workers only receive the paste prepared by the workers in their digestive organs during the first days of their life, whilst in the latter days of their larval existence they are fed with pollen and honey. The queen-larvæ on the contrary, are supplied with the above paste during their whole larval existence. Leuckart found the first traces of the internal genital organs in the female larvæ of six days old. It is exactly at this time that the change of food takes place in the worker-larvæ, which, up to this period, are nourished just like the queen-larvæ with the same paste. In this way we get an explanation of the circumstance which has been observed by most experienced apiarians, that a female larva does not require the usage of a queen from its earliest period to become perfectly sexual, but that worker-larvæ, even several (six or seven) days old, may also be reared to queens, when their narrow cells are subsequently enlarged, and they are abundantly supplied with royal-paste instead of with worker's food, (pollen and honey).

If, then, it is certain that a worker-bee or a queen may be reared indifferently from every larva of a worker-cell derived from a fecundated queen, the case may probably occur in one beehive or another, that by some confusion or disturbance in the regular distribution of the food, some of the royal food falls to the lot of one or several worker-larvæ in the neighborhood of a queen's cell, into which royal food is carried, by which their sexual organs are more or less developed. By this influence the development of the female genitalia may have been abnormally elevated in a worker up to the power of laying true eggs. Such egg-laying workers, however, always remain unfecundated; they do not feel like perfect female bees, and undertake no wedding-flight; which, indeed, would be of

no use to them, as the development of their copulative and fecundative organs has not kept pace with that of their ovaries and oviducts. The external sexual organs, as well as the seminal receptacle, remain abortive in these egg-laying workers, for which reason they are not in a condition to copulate and receive fertilizing semen. They will, therefore, only be able to lay unfecundated eggs, from which, if they actually arrive at development, only male bees (drones) are produced, no matter whether they were laid in worker-cells or drone-cells. The cause of the production of an excess of drones and humped-brood comb in a queenless hive is, therefore, that as regards the nature of her deposited eggs, an egg-laying worker-bee is in exactly the same position as an egg-laying virgin queen—both can only be the parents of drones.

Why the egg-laying workers can only lay unfertilized eggs, I have already explained in my letter to the Baron of Berlepsch. At that time, indeed, I had not been enabled to dissect an egg-laying worker-bee; so that the principal proof of the correctness of my views as to the drone-productiveness of the workers still had to be obtained. This proof Baron von Berlepsch has since furnished by dissecting a worker-bee which was laying drone-eggs, and finding therein a small ovary with about eight pretty well developed eggs, but no seminal receptacle. He did not content himself with this investigation of his own, but in order to make the unbelieving apiarists more inclined to accept the truth, he also called in the assistance of an entomologist. At the request of Berlepsch, Leuckart, of Giessen, dissected at Seebach two workers taken in the act of laying eggs, of which, unfortunately, one individual as Leuckart reported, was no longer in good condition; but on the other hand, in the second individual he was able to prepare the sexual apparatus with its different parts in connection, and to recognize the egg-laying bee from its construction at first glance. On the right side he found six, and on the left five, ovarian tubes, with single mature eggs. The single oviduct, as Leuckart said, was without appendages. In the first-mentioned egg-laying worker also, Leuckart could detect no seminal receptacle, although this structure is still distinctly recognizable in the queens, even when the other entrails are almost entirely dissolved by decomposition. I must here recall the fact that, as I have already mentioned, the seminal receptacle is not entirely wanting in the workers, but that it remains undeveloped in them, and may be detected as a small appendage to the oviduct by a close microscopical examination. Leuckart overlooked this appendage in the egg-laying bees examined by him, but has convinced himself, as he himself admits, by subsequent investigations of the presence of the rudimentary seminal receptacle in worker bees. At any rate, it appears from the investigations of Berlepsch and Leuckart, that in the egg-laying workers dissected by them, the seminal receptacle was not present in the same degree of development as in the queen-bee, as in its perfectly developed state it is visible even to the naked eye, of the size of a pin's head, and con-

sequently could not have escaped the notice of those two observers.

Another cause of drone-productiveness in a bee-hive may also be explained consistently with Dzierzon's theory. Thus in certain, but undoubtedly very rare cases it happens that fertilized queens in advanced age, towards the end of their vital activity, become drone-bearing, after showing themselves to be normal up to that period, as regards the production of drones, females, and workers. Normal fertilized queens, therefore, in course of time lose the faculty of producing workers and females. The brood deposited by such old queens can only be reared to male bees—certainly, according to Dzierzon's theory, for the self-evident reason that the store of semen in the seminal receptacle of a fertilized queen is gradually exhausted. As a queen only undertakes the wedding-flight once in her life, and fertilizes many thousands of eggs destined for the worker-cells for several consecutive years, with semen received by a single act of copulation,* although one or two spermatozooids of the male semen are employed in the fecundation of one egg, yet the seminal mass will at last be used up, and at the same time the old queen will lose the faculty of laying the required number of fertilized eggs.

From the circumstances hitherto described, it will be evident how a queen, which has not been fertilized, or an old queen, or an egg-laying worker, must act injuriously upon a colony of bees. They constantly cause confusion in a hive, as they only produce lazy drones, and cannot, from inability to produce new workers, replace the loss of workers, to which every bee-hive is exposed. On the other hand, a colony of bees which rejoices in the possession of a vigorous fertilized queen will thrive well, as the drones, the workers, and the queens required for the emigration of young swarms, are produced by her at the right time, and in the proper proportions as to number, for which purpose the workers prepare and arrange the necessary drone-cells, worker-cells, and queen-cells.

Dzierzon's theory also includes the assertion that every normally organized queen must at the same time possess the power of laying male or female eggs at will; that is to say, of leaving an egg unfertilized, or depositing it fecundated at will, when engaged in laying her eggs.

The answer to the question, how a queen can know when she has to lay a male or a female egg, will be that instinct will tell her, and truly at the moment when she pushes her abdomen into a wide drone cell, or the narrow cell of a worker for the purpose of laying an egg. The distinction of the wider and narrower cells will certainly be felt out by a normal queen with her abdomen, and by this sensation she will know that she must fertilize the egg to be deposited in a narrow cell, while she has to lay down the egg without fecundation in a wide one. By the peculiar texture of an incomplete royal-cell too, a normal queen will be instinct-

*According to a statement made to me by Dzierzon, a queen may acquire the power of laying fertilized eggs for five years, by a single normally executed copulation.

ively induced to fertilize the egg to be deposited in it. By this means Dzierzon might have explained that phenomenon in the bee-hive which has always excited astonishment as a wonderful mystery, namely, that faculty possessed by a normal queen of furnishing the drone-cells, worker-cells, and queen-cells of the combs, which are arranged in different number and order in every bee-hive with the right eggs. It would certainly still remain to be proved from the organization and arrangement of the separate sections of the female sexual organs, that it really was possible for a fertilized queen, by the presence of decidedly voluntary muscles, to retain the semen in the seminal receptacle or evacuate it at will. From the investigation above referred to, which I made upon fertilized female insects, it appears that by the copulation of insects the ovaries are not fecundated, but that the seminal receptacle is filled with semen, and that the fecundation of the egg only takes place during oviposition at the moment when the egg to be laid slips by the orifice of the seminal receptacle in the oviduct. With regard to this, I may refer to those female insects, which, after the completion of copulation, survive their males in the autumn, hibernate with the ovaries imperfectly developed, and only lay fertilized eggs capable of development in the following spring, after their ovaries have become filled with mature eggs. Such females, therefore, preserve the male semen received during copulation in their seminal receptacle, keep it fresh probably by the aid of the secretion of the appendicular glands of the seminal capsule, and evacuate it at pleasure when required during the act of laying. For this purpose particular voluntary muscles do really exist. I have observed them in the vicinity of the exterior of the seminal capsule in many female beetles. In the immediate vicinity of the seminal receptacle of female bees also, I have seen voluntary muscles without, however, being able to state with certainty what definite functions they have to perform. From this the possibility of a voluntary evacuation of semen from the seminal receptacle of fecundated female insects could certainly not be denied, especially as the voluntary deposition of male and female eggs by a queen-bee may be proved by the brood produced from her. After I had called the attention of Von Berlepsch to the existence of voluntary muscles of the seminal receptacle, he expressed himself upon this point in the following way: "Probably the queen has the faculty of closing the orifice of the receptacle at pleasure, perhaps by the contraction of the whole vesicular membrane, or even that of removing and somewhat retracting the whole receptacle sideways from the tube of the oviduct into which it opens, so that those eggs which she wishes to deposit in male cells may glide past untouched by the semen."

The power of a fertilized queen to lay male or female eggs at pleasure, may also be proved by the following experiment. In a Dzierzon hive we may, to a certain extent, compel a fertilized queen to lay male or female eggs. The construction of one of these hives permits the nature of the combs prepared in it by the work-

ers to be closely inspected. If the workers of a hive furnished with a normal queen prepare too many drone-cells, which we may, perhaps, not wish to have, or if the hive requires more workers, we may remove the drone combs, whose cells the queen would have supplied with male, that is to say, unfertilized eggs, and instead of these suspend combs with empty workers cells. The queen will furnish these combs also with eggs, and indeed to correspond with the nature of the cells, with female or fertilized eggs, from which the workers may rear their like. In the summer we may induce the queens of populous hives to lay drone-eggs, if we suspend an empty drone-comb in the midst of the hive. From this it follows that the intelligent bee-keeper has it in his own hands in what direction he will turn the activity of this or that colony of bees, and that by suitable assistance he may prevent the disorganization and demoralization of a bee-hive.

Before I turn to the strictly scientific proofs which I have still to furnish, in order to give permanence to the view upon the reproduction of the bees put forward by Dzierzon only as a hypothesis, and raise it to the rank of a theory, so that it may take its proper place in the history of animal development, I will here cite a few more empirical proofs, by which alone the correctness of Dzierzon's theory would be convincingly shown, if its importance did not require still more impressive facts for its establishment.

I must not omit to mention that Dzierzon himself, after calling a number of opponents into the field by the promulgation of this new theory, and after all possible imaginable objections had been raised from the most various sides against its correctness, began to doubt the perfect tenability of his theory. Notwithstanding that Dzierzon very recently expresses himself with peculiar reserve and caution upon certain points of his theory,* other experienced apiarists still held very firmly to it, as after it had once become familiar to them by its assistance every occurrence in a bee-hive, however unexpected or apparently strange, was instantly understood by them.

Above all we must here mention Herr von Berlepsch, who has set himself the task of testing Dzierzon's theory in every direction, with his abundance of bee-hives. His establishment of bees, which is most carefully attended to, and kept in the most exemplary order, also offers quite uniquely in its kind by the disposition, arrangement, and mass of its materials, the best and most certain opportunity of testing and answering those questions relating to bee-life raised by Dzierzon.

The following extremely interesting experiments were made by Berlepsch, which must again convert Dzierzon to himself, since he appears to have become a doubter of his own theory.

In May, 1854, Berlepsch caught an old fertile queen and confined her in a small queen cage, in order to incorporate her with a new colony of bees after its establishment. She was in the

*See his *Bienenfreund aus Schlesien*, 1854, No. 8, page 64.

normal state, and up to that time had produced the necessary drones and workers. Berlepsch gives the following account of this queen: "As I was closing the lid, (of the queen's cage) which ran in a groove, I pinched the queen so strongly at the apex of the abdomen, that she contracted the whole abdomen like a bee that had been stung, and allowed it to drag after her. I thought at first that she was lost, but as she was still living an hour afterwards, and sitting again extended and quiet, I gave her back to her people. She laid, as before, thousands of eggs, but from all these nothing but drones were henceforward developed. If I had only dissected this queen as soon as I became aware of her drone-productiveness, I should at least have seen whether the seminal vesicle was still in existence and normally filled. But I delayed the dissection, and when at length I wished to undertake it, the queen was gone. This certainly was a very remarkable occurrence, which speaking loudly in favor of Dzierzon's hypothesis of the unfecundated state of all male eggs, was communicated by me privately to President Busch for his opinion, as I could not then form any definite opinion for myself, not then knowing with certainty that the vesicle is the *receptaculum seminis*, and the white slime (its contents) the *sperma virile*. Busch, however, was also unable to form an opinion; my servant Gunther on the contrary, thought that perhaps the receptaculum had been crushed and destroyed. This, however, I regard as extremely improbable, as the crushing of the receptacle, which is generally very firm, between the soft surrounding parts of the body of the queen, without quickly leading to the death of the latter herself, is scarcely possible. I believe, therefore, that it was only the organs which may act in opening and closing the orifice, or in retracting and advancing the receptacle that were lamed, stiffened," &c.

If I am to express any opinion upon this interesting case, I suppose that by the pinching of the abdomen the seminal receptacle of the queen filled with semen, was torn away from the oviduct at its opening point, by which the queen thus injured, was no longer enabled to fertilize her eggs during deposition, and therefore could only lay unfertilized and consequently male eggs.

Berlepsch reports as follows upon another experiment confirmatory of Dzierzon's principal point, which he made in consequence of studying J. Muller's *Physiologie des Menschen*: "Now only did I obtain a full conviction of the existence of the spermatozoa; and when I read in the above mentioned work that *high and low temperature cause the movements of the spermatozoa to cease*, I thought to myself: Now you have a complete explanation of Dzierzon's case;* and if it be true that in *apis mellifica*, the male eggs regularly develop themselves spontaneously into males, but are only converted into female eggs by the fecundation of the spermatozoa, every normally fruitful queen must cease to lay female eggs from the moment when we succeed in rendering the spermatozoa motionless (killing

them) without destroying the mother herself. At the end of June, 1854, therefore, I took three very fruitful queens, imprisoned each of them in a queen cage, went to Muhlhausen and placed the cages in the ice-cellar of an inn-keeper there who was a friend of mine. There I left them for about thirty-six hours. The queens were of course completely benumbed, regularly covered with hoar frost, and when I returned with them to Seebach, I exposed them to the sun, which was just rising. For a long time none of them stirred; at last, towards seven o'clock, I observed movements of the feet in one of them. By means of a fine bit of wood I put a little honey upon her proboscis, and in ten or twelve minutes more, she had again returned to life. The two others on the contrary were dead. This appeared very remarkable to me, as even worker-bees, whose vitality, however, is very much weaker than that of the queens, generally survive such a short freezing; and the only reason I can find for it, is that the temperature of the ice-cellar was too low, and therefore the queens were too much penetrated by the frost, if the circumstance that the queens were too heavy with eggs, and therefore less able than at other times to bear external injurious influences upon their bodies, may not have co-operated to produce death. I returned the revived queen to her people. She laid, as before, thousands of eggs, but from all of them only drones were evolved. When I subsequently examined the semen, I found it less consistent and with a yellowish tinge."

From this extremely interesting experiment, it follows evidently that the male eggs of the bees require no fertilization. The spermatozooids which this queen, exposed to such an intense cold, contained in her seminal receptacle, were certainly benumbed, and did not again become capable of movement after the thawing; so that therefore this queen could only have laid unfecundated eggs, for even if she had emptied the contents of her seminal receptacle over the eggs when laying them in order to fertilize them, the numbed spermatozooids would have remained incapable of action.

A third empirical proof by which the principal point of Dzierzon's theory of reproduction is supported, is furnished by the phenomena which may be observed in the production of males amongst bees. Attention has only been directed to the production of hybrid bees at a very recent period, since the Italian race of bees has been introduced into Germany by Dzierzon and Berlepsch. The so-called Italian bees form no separate species, but must only be regarded as a variety of the *apis mellifica*. These Italian bees are distinguished at the first glance by the leather-yellow color of their abdomen from the unicolorous blackish-brown German bees. In the females and workers of the Italian race, the first, second, and third abdominal segments appear of a rusty-yellow color, (*colore rufo-ferrugineo*) and margined with black. This black margin is very narrow on the first segment, broader on the second, and broadest on the third. The Italian drones have the middle of the hinder margin of the second, third, and fourth, and often that of the fifth abdominal segment broadly rusty-yellow

*Berlepsch here refers to the case communicated by Dzierzon, that a queen which had been frosted for a long time, after being brought to life by warmth, only laid male eggs, whilst previously she had also laid female eggs.

by which the blackish brown abdomen of these drones appears to be furnished on the back with from three to four rusty-brown transverse bands, of which the first is the broadest. The German drones on the contrary, have the abdominal segments only narrowly margined with rusty-yellow. According to the statements of Dzierzon and Berlepsch, who have done especial service to the breeding and diffusion of the Italian bees in Germany, these golden-yellow bees are not only more beautiful, but also more industrious and better tempered than the German bees. These latter properties are also the cause of the Italian bees having become so much liked amongst us, and of so great a demand having recently arisen for them, so that Berlepsch found himself under the necessity of declaring publicly, that *"if the Italian good-tempered, industrious race, with its beautiful color is to be kept pure and stereotyped, perhaps even improved, Dzierzon and I must be left in peace for at least one summer."*

It is a well-known fact that by the crossing of different races of a species of animal, hybrid forms are produced, which unite in various ways certain characters of the two individuals of different races which were employed for the production of such hybrids. It was natural to suppose that in the bees the production of such race hybrids must be combined with peculiar modifications. If Dzierzon's theory proved correct, we might beforehand expect that by the copulation of a unicolorous blackish-brown German and a reddish-brown Italian bee, the mixture of the two races would only be expressed in the hybrid females and workers, but not in the drones, which as proceeding from unfecundated eggs must remain purely German or purely Italian, according as the queen selected for the production of hybrids belonged to the German or the Italian race. In fact the expectations of the apianians were not disappointed. It is true that in these crossings of the races many remarkable occurrences, such as also happen contrary to expectation, in the crossing of our larger domestic animals were still necessarily left unexplained. According to Berlepsch's observations, 1. Many Italian mothers produce partly black and partly variegated bees under all circumstances; that is to say, whether they have been fecundated by a German or an Italian drone; 2. Many Italian mothers produce only variegated bees when they are fertilized by an Italian drone, but variegated and black ones mixed when fertilization is effected by a German drone; and 3. Many Italian mothers produce only variegated bees under all circumstances; that is to say, whether they are fertilized by an Italian or a German drone. Such true Italian queens, adds Berlepsch, produce Italian bees from the very first, when fertilized by an Italian drone; but on the contrary, when fertilized by a German drone, they also produce German bees at first for a longer or shorter time.

Here I must insist upon the fact that these statements of Von Berlepsch only refer to the production of workers and female bees, but by no means to drones. He endeavored to explain these surprising and singular facts, which reposed upon two years' experience, in the following manner. He refers to the existence of the appendicular gland so intimately connected with

the seminal receptacle, to which I had already in the year 1837 ascribed the office of preserving by its secretion the seminal mass remaining for months in the seminal capsule in a fresh state. Berlepsch, starting from this view, now thought that the maternal liquor of the appendicular gland constantly penetrating (into the seminal receptacle) gradually permeates the spermatozoa to such an extent that their paternal elements are overpowered by the maternal ones. If the mother bee is of pure Italian blood, none but variegated bees must be produced from her fertilized eggs as soon as the spermatozoa derived from a German drone are sufficiently permeated; but on the contrary, if the mother be not purely Italian, black bees will always remain. This conjecture which I only quote here for the present as a conjecture, without saying anything for or against it, Berlepsch also endeavored to support by the behavior of a German queen, which being fertilized by an Italian drone, produced last year variegated bees amongst the black, but this year only black bees.

In all these observations with reference to the propagation and multiplication of the Italian race of bees, the brood of drones always turned out purely Italian or purely German, even when crossings occurred between German and Italian bees, according as the queen subjected to crossing belonged to the Italian or the German race. But in order to attain certainty with regard to these phenomena, the observations to be made for this purpose must be performed with the greatest care. The observations will have to be made with individuals of perfectly pure race, which will not always be obtained with ease and certainty, since the breeding of the Italian swarms side by side with the German bee-hives is already carried on amongst us to a very great extent. How difficult it may be to find a perfectly genuine and pure queen for such experiments, is shown by the mixtures of the two races of bees in question, observed by Berlepsch and already referred to. I can, therefore, lay no very great stress upon an observation which Dzierzon made upon an Italian queen, and which, as I have already indicated, has made this cautious apianian doubtful of his own theory. This isolated case, in which, moreover, some circumstance might probably have remained unnoticed, cannot overthrow a proposition, the correctness of which has been confirmed in so striking a manner by a number of other observations. How Dzierzon was surprised by some such disturbing accident appears from his own statement, which I will give here literally, in order to show that Dzierzon is not one of those who cannot be led away from a preconceived opinion, whether it be right or wrong. His words* are as follows:

"Continued observations of the hybrid hives must be no less adapted to raise the veil more and more to penetrate into the obscurity and finally bring the mysterious truth to light. If the drone egg does not require fertilization, Italian mothers must always produce Italian drones, and German mothers German drones, even when they have been fertilized by drones of the other race. The Silesian Apianian (Bienenfreund)

*See *Bienenfreund aus Schlesien*, 1854, No. 5, page 63.

possesses hybrid hives of both kinds, and did not permit any want of observations so far as the limited time enabled him to make them, but he met with new unsolvable riddles. The Italian hybrid mothers have, throughout, completely confirmed the supposition and produced the most beautiful Italian drones, one almost more beautiful than the genuine stocks, the maternal stock itself. Of two German hybrid hives, one also produced only the ordinary black drones; the other the same, but unexpectedly amongst these a few appeared which glittered like gold, and were yellower than any single bee even in the genuine Italian hives. It certainly was possible that even here a beautiful Italian amongst the workers, of which a portion had the color of indigenous bees, and another portion that of the Italians, might have laid some eggs, from which the few yellow drones might have been produced. Nevertheless, the Silesian Apiarian is not particularly inclined to explain the phenomenon in this way, so as not to expose himself to the suspicion that only a predilection for his hypothesis led him to have recourse to this explanation, as in point of fact the deposition of eggs by worker bees when a queen is present, is an exceptional occurrence of the rarest kind. Although the vesicle filled with semen does not implant the vital germ for the drone in the egg, may not a peculiar emanation from it nevertheless act in determining the kind and color?"

Dzierzon is certainly in the wrong, when, for the sake of this one observation which disturbs him, and in order to explain it, he again calls in the aid of the long overthrown hypothesis of an *aura seminalis*. Von Berlepsch has taken the trouble to invalidate the case detailed by Dzierzon, which is said to speak against his own theory. He very justly observes that in the preceding, Dzierzon has not established the fact that those few golden drones were actually produced by the queen, and not by a very fine egg-laying worker; (as the half of the workers in this hive consisted of these) for although the presence of an egg-laying worker together with a queen is a case of the very rarest occurrence, yet it can be proved that such exceptions do occur. Berlepsch also points out with reason that Dzierzon was never perfectly certain on the point, whether the queen, in whose hive he observed the remarkable yellow drones, was by birth of the true German race, or produced from hybrid brood. Dzierzon himself adds the warning to the statement of his case, that in such observation great caution is necessary to avoid erroneous conclusions, as on such occasions we must be perfectly sure that the queen belongs by birth to the right race; for if she has been produced from hybrid brood it is impossible for her to produce even pure drones, but she produces half Italian and half German drones. However, I regard this doubt, which had been raised in Dzierzon with regard to his own theory, and by his own observations, as a sufficient reason for getting further information from Herr Von Berlepsch, who had obtained great experience in breeding Italian bees for the last two years, with regard to the real truth in the production of hybrids taking place between Italian and German bees. On the 2d of March of last year, (1856) he replied to my questions

put to him for this purpose, in the following manner. In the first place he referred to his observations already published in the *Bienenzeitung*, where he says: "All queens which are of a beautiful yellow externally only produce Italian drones, even when they produce partly Italian and partly German workers. A German mother, which was fertilized by an Italian drone, produced German and Italian workers, but only German drones. When on the contrary the mother is not of a fine yellow—when she has traces of black in her, the drones also come forth mixed, whether the mother be fertilized by a German or an Italian male; of course because the males only take after the mother." To this Von Berlepsch added the following commentary in his letter: "An Italian queen fertilized by a German drone, or a German queen by an Italian drone, constantly (only one exception has occurred to me) produces females (workers, queens,) of three different colors; a. *True Italians*, that is to say, as yellow and banded as the female descendants of Italian queens which were fecundated by Italian drones; b. *True Germans*, and c. *Mongrels*. With many mothers the Italian, and with many the German descendants predominate; but the mongrels, which as regards color, are intermediate between the Germans and the Italians, are *always* in the minority, and indeed in the greatest minority, for in many hives we rarely see a mongrel, and in many none at all. Now as the queens are only workers, otherwise, that is to say, further developed, the same conditions occur in them also, and in hybrid mothers the color of the royal descendants depends upon the egg. If the egg would have given a true Italian worker, it also furnishes a genuine Italian queen, &c. The males, without exception, follow the mother as regards color, and during the last summer I was unable to discover with hybrid mothers even a single male which resembled its father, in spite of the most careful observation and closest examination.

After such important empirical facts, derived from the observation of a great number of productions of hybrid bees, it must therefore be regarded as certain, that in accordance with Dzierzon's theory, bees of pure race are deprived of the power of producing hybrid drones.

[CONCLUDED NEXT MONTH.]

[For the American Bee Journal.]

American Bee Plant.

Over the name of A. A. Terry, on page 58, of the September number of the BEE JOURNAL, volume 3, we find an article recommending this plant as a great honey-yielding plant in the vicinity of Chicago. Will the writer of that article please favor me with a package of seed of said plant, and I will reciprocate the favor.

I am passionately fond of bee-culture, and wish to procure the best honey-yielding plants.

The reason I make this request through the AMERICAN BEE JOURNAL is, I enclosed some money directed to Mr. Terry at Chicago, (Ill.,) but received no answer. Chicago may not be his address.

A. SALISBURY.

CAMARGO, DOUGLASS CO., ILL.

For the American Bee Journal.

The Eureka Hive Again.

BOMBASTES ab initio, FURIOSUS de finibus.

At length I own the power of the pill,
(Horace Epod. xvii, 1.)
The physic makes him worse and sicker still.

(Anecd. xii, 46.)

MR. EDITOR:—As our amiable and beloved brother correspondent, Wm. A. Bennett, confines my strictures upon Allen's Bee Hive to *plain English*, I would beg your leave at present to remark briefly that inasmuch as the bombastic introduction to the object under review, July No. 1867, page 17, smacked so strong of Greece and Rome, I felt as though all my Greek and Latin quotations were necessary to impress his super-lucid, logical faculties with my high appreciation of his ancient rhetoric; and as though his Sophocles and Virgil were not disgraced in the presence of an Archimedes and a Cicero.

If brother Bennett means to pick a literary quarrel, I confess that I am not the man who has sought either to provoke his acidulated retorts, or to engage in a dispute upon so ignoble an object as the hive in question, but simply meant to inform my bee-keeping friends upon matters with which I consider myself as well acquainted as brother B. Still, as *plain English* seems to be good enough for my very modest friend, I shall not refrain from giving to him, as well as "to all whom it may concern," my opinion in his vernacular dress.

In the first place, I disclaim all intention to misrepresent his language. The withdrawing of frames from the hive is a very simple matter in any movable comb-hive; not so, however, their replacement, without killing any bees. It is one thing to open a hive and close it, for the mere purpose of gratifying the curiosity of a visitant friend, and quite a different one to perform practical operations with the same.

In nine cases out of every ten, the practical apiarian wishes to ascertain the state of the central combs only, not merely of one hive, but of nearly all, in as short a period as possible, and in these particular instances I deny the least adaptedness to public favor to this puffed-up imitation of a hive, which as described elsewhere, requires indefinitely more skill in management and time in operating, than the Langstroth hive in any of its various *legitimate* forms. Supposing the operator would wish to confine the queens toward the end of the honey season, he, with the Langstroth hive, removes the honey-board, shifts and lifts any particular frame where she is most likely to be found; and not unfrequently this hive may be opened, the queen confined and hive closed up, before a side-opener is ready for the removal of a single frame. Does he wish to obtain brood from a side-opener with the thermometer at 60 or 64°? Even Mr. Bennett, if he understand anything about the matter, will surely not pretend to insist that he can obtain it, replace the frames, and insert it in its appropriate place without

chilling it, or killing it outright. And how would it work with these hives, were you to take away the queens with the view to their constructing queen cells, intended for the multiplication of stock, at a time when the hives with permanent sides are often too cold to insure their construction and safe removal to nuclei?

Now, all this, in addition to what I have already said elsewhere, is surely not a very great great inducement to apiarians who understand their business, to produce and introduce them into their yards; and if these do not patronize your hive, your hive will surely *never become popular*, and this I call *plain English*, without misinterpretation, as well as the point which I intended to establish, and which time will prove I have established.

As to brother Bennett's "*incidental allusion*," Sir, you will find by referring to his description that this *framè work and frames* were by him considered "perhaps the most important improvement;" and that therefore *quibbling* about *incidentals* were unnatural, inasmuch as the *main subject* is altogether worthless in itself. These, my very dear sir, are no misstatements, and need not the assistance of my silent friend Cicero to make them weigh with that class of people who buy *homes* for their bees, as we think, *clearly pre-eminent*.

If, however, these *plain English* ventilations of the "Home" are not thought sufficient to put it in a healthful condition, the subject may, by a little more pressure and the forbearance of the Editor, be made susceptible of admitting such a quantity of *condensed steam*, which, by *bursting* the container, will cause it to collapse of its own accord, and occasion the loss of another grain or two of that homeopathic apis with which its logical advocate is so superabundantly imbued. Yet, as in my opinion, I have neither harmed nor fondled the poor thing in any way, I would earnestly entreat all those fond of the "best of its kind," to invest a couple of dollars in the purchase of a dozen or two, and report their favors through the present medium, and thus help it and its protectors upon their legs, for the sole sake of another additional public good. And if already I have not done more good than harm by thus indirectly advertising an object, which, in my private opinion, publicly expressed, is altogether worthless in profitable and extensive bee culture, I shall feel more happy than hurt by brother B.'s irascibility, which smacks a little too much of that kind of logic, that always entirely fails at writing or reasoning a darling hobby into public favor and approbation.

You will, therefore, perceive, Mr. Editor, that I have not endeavored to conform to syllogistic reasoning, because movable sides and distanced frame-works have been coherently reasoned out of use "long, long ago." And as moreover that kind of reasoning would avail but little with a writer so dead set against quotations, who can yet quote the illustrious "moon of green cheese," "the world-famed millstone," and "Necker's two spears of grass," without giving credit to the dapperling world for the

same, I have concluded to *annihilate* him in plain English, thus:

"Howling, roaring, and a thousand groans,
Expressed his torments in most dismal tones."

CICERO de Finibus, II, 29.

Profoundly, your "very learned and luminous servant,"

F. VARRO.

CANTON, PA., October 12, 1867.

[From the Iowa Homestead.]

Luck in Bee-keeping—Drones and Moths.

EDITOR IOWA HOMESTEAD: When I was twelve years old my father told me that as he could never have any luck with bees, I might buy a swarm and have it for myself; and in those days bees would not do anything without you bought somebody's luck, and you must not pay money for bees, but if possible exchange sheep for them, &c. I could find plenty of swarms at three dollars each, but they would not sell their lucky swarms. I finally found a widow who sold me her lucky swarm for seven dollars' worth of hemlock lumber, with a verbal agreement that I was to have her luck with it. The consequence to her proved to be bad, for her bees would swarm and go into the woods, &c.; but I had the best of luck. I kept that swarm twelve years in the same comb, and I never failed to have two swarms and sometimes three every season, and a box of honey from my old swarm. My young swarms would do well the first season, but only once in a while one that would do as well as the old one the second season. I soon began to study what made that swarm always have a fertile queen—always be lucky—simply because the comb was built right; every comb was straight, and every comb was a brood comb. If you get the hive in the right form, and attend to the building of the comb the first season, you will have all lucky swarms. I make all lucky swarms now, and I do not consider a swarm in proper working order until it is made into a lucky swarm. There is no need of having small swarms in the fall to double; the summer is the time to fix up your bees for winter—fall is too late. Again, I want you to understand that I do not claim that the hive I use is the best, by any means; but my method of building up swarms is correct, I care not who says to the contrary. That is the method I have recommended: We will suppose that you allow your bees to swarm naturally; well, here is a large swarm that come out when the basswood is in full bloom. The bees make comb very rapidly, and fill their hive with comb in eight days, as I have known them to do; at least one-third of said comb will be drone, or store comb, which is good for nothing for raising workers next season; or, we will say a second swarm comes out at the same time with a young queen; it will take her some time to come up to her full breeding capacity; if they fill the hive, there will be more honey than bees, and large quantities of the comb is built for stores, &c. Neither of those swarms will be lucky swarms, either for raising bees or storing honey, just so long as you keep the comb in that condition; and here I will let

some of my bee-keeping friends into a secret—that is, if you do not have any more drone comb in each hive than you want, (which is but very little, where you keep a number of swarms), your bees will not be expending time and honey raising drones, and you will not have to pay a patent-right man anything for his drone trap; in other words, if you do not raise drones you will not have them to catch, on the same principle that if you do not raise any moths you have not got to catch them with a patent moth trap. I never lost a swarm by flight or with the moths, because I keep lucky swarms, I suppose.

E. GALLUP.

OSAGE, IOWA.

For the American Bee Journal.

Can Italian Bees be Improved?

DEAR JOURNAL: Having been a reader of your columns for a year or so, I have become somewhat acquainted with your numerous correspondents, and feel rather inclined to be reckoned as at least a sort of second cousin in the family. And since one of the family "living some miles from land, away out from shore," who has raised an Italian queen which produced a worker progeny with four yellow bands, instead of the usual number of three, and thus became the object of a criticism by a brother, namely, "raising Italians *more than pure*," I wish to say a word on the subject of purity of varieties, and the improvement of the same.

For the last five years I have been experimenting with the Italian variety, and have received queens from Mr. Langstroth three or four times; and have bred from a queen raised by Mr. Colvin, of Baltimore; also from one from an apiary in the north part of this State; and likewise from one of six queens which were brought here by Prof. Harrison, of Ohio.

In these experiments I think I have verified the following facts:

First. That the Italian bee can be improved just as easily as any other animal, and by the same means. That is, by selecting the largest, brightest-colored, most prolific, best tempered, and best honey-gatherers, and breeding only from such colonies as have these qualities.

Let this be done from year to year by every apiarian, and the man that lives "several miles from land" will not be the only one who will raise queens "*more than pure*."

One year ago last September, I received my beautiful queen from Rev. Mr. Langstroth, that breeds workers fully up to the standard. In size the workers are perceptibly larger than any of the old black variety that I ever saw. In color, they have, without exception, three yellow bands, which are always visible, whether the bees are loaded with honey or not; and the remaining bands are of a whitish yellow, so that the bee presents a yellowish color throughout. When I saw the progeny of this queen, I thought I had drawn a prize. The young queens raised from her were nearly all highly colored, with one of a darker hue occasionally. After I commenced breeding from her last spring, I observed one day pouring forth from a colony

into which I had inserted a queen last fall, such a shower of bright golden bees as my eyes had never seen before. In size and color, I saw at once that Mr. Langstroth's queen could not compete with this one. And what raised my enthusiasm to almost a fever heat was, to see that the drones were as bright-colored as the workers. I immediately commenced breeding from this queen alone, and have not failed in all I have raised this summer, in producing young queens as bright as the mother.

And now to the second point, viz:

Queens can be had whose queen-progeny will all be of a bright yellow, except the two terminal rings of the abdomen, which will be of a darker color approaching to brown.

I saw such a statement questioned by many of your correspondents, after it was made by Mrs. Tupper, of this State. My experience, thus far, goes to verify her's.

And further, almost all writers disagree with me in the following, and I am not certain that I am correct; but at present I look with suspicion on any queen as proper to breed from, which does not produce bright yellow drones as well as workers. The black bee exists in Italy as well as the bright and pure yellow variety; and hence all may not be pure that are imported from that country. The experienced apiarian, however, can only determine this point. So to guard against any possible impurity, let every apiarian remove all stocks from his apiary, which do not produce bright drones as well as workers, and the result cannot but prove satisfactory.

But as every sermon is supposed to have three heads, so has my sermon on bees.

I hasten to my third point, viz:

Pure Italian bees are extremely amiable in temper or disposition.

I do not know why such is the case, but in corroboration of what all assert who have experimented with them, I know that my Italians are not a tenth part as much inclined to sting as the common bee.

From the foregoing facts, coming under my own observation, I propose to select such colonies alone as have the characteristics of workers of larger size; bright yellow bands, three in number; amiable disposition; whose drones also are bright yellow; and which are *strong in number and rich in stores*. From the best of these select the queen or queens to breed from, and remove all the others some distance away.

If this be persistently done, I have no more doubt that the Italian bee will ultimately be very much improved, than I have of the capability of improving by a similar process, sheep, swine, neat cattle, and horses.

E. L. BRIGGS.

MT. PLEASANT, IOWA.

Mr. Curtis in the London *Gardener's Chronicle*, 1841, states that his garden beans suffered greatly in the spring of that year, from the holes which humble bees (*Bombus terrestris* and *lucorum*) made in the blossoms, as they usually do, to get out the honey contained in the nectary; which operation, injuring the pods in their earliest state, four-fifths of them were destroyed and produced no beans.

[For the American Bee Journal.]

Purity of Drones.

ON BOARD STEAMER AMERICA,
BETWEEN NEW YORK AND BREMEN,
August 27, 1867.

EDITOR OF THE BEE JOURNAL: On reading the "Bienenfreund aus Schlesien," published by Dzierzon, volume 1, 1854, pages 63 and 64, I observed that he had really found in a hive with a black queen impregnated by an Italian drone, some beautiful yellow drones; and that he thinks further investigation is necessary to solve this question of the purity of drones. Whether he has made any more observations or not, I have not learned; but presume that he has long ago come to the conclusion that drones from impurely impregnated queens are impure too, even if not in the same degree as the workers. If there is the slightest degree of bastardizing perceptible in the drones of such mothers, they must of course be impure; and an Italian queen impregnated by such a drone is bastardized, even though it be not to the extent that her progeny show their impurity. Perhaps the imperfect three stripes in one of forty of the worker progeny of such queens, which a well-known writer remarked to me were found in all her pure stocks, is a consequence of such an impregnation. I found about such a proportion of imperfectly marked workers myself in a small number of my hives. But these same colonies have, in most instances this year after swarming, raised queens from their own brood whose worker progeny is perfectly marked. But not only these colonies, but nearly twenty-five others that had each a number of apparently perfect black workers, have this summer raised queens whose progeny are beautiful and all perfectly marked. I therefore come to the conclusion that the Italian bees "run in" as fast as they "run out," if in an apiary or neighborhood one or the other race is predominant. To raise purely impregnated queens will therefore be very easy for me hereafter. The proportion of bastardized queens raised this summer, whose progeny I saw before my departure from home, was only fourteen out of about one hundred and fifty.

It will be interesting to the readers of the BEE JOURNAL to learn that I have taken two small colonies of Italian bees with me on my journey to Italy, intending to compare them minutely with Prof. Mona's bees in Italy, if I succeed in carrying them there alive.* I will further make very careful observations whether the bees there are all perfectly marked with three bands, inquire of Prof. Mona whether or not young queens vary in color, and whether it is required that they should be splendid yellow, leather-colored, black, or brown; and probably get the Professor's answer in writing, to be sent in the original to the editor of the BEE JOURNAL.

If it should then appear from my observations and the Professor's reply that the queens in my apiary are bastardized, I will frankly state it,

*This letter was in type for the last number of the BEE JOURNAL, but inadvertently crowded out.

and give as clear a description of the pure Italian or Ligurian bee as I may be able to make. I trust that on seeing the pure race in its native country, and comparing a hundred queens raised and impregnated there, I shall be as well qualified to write about the purity of Italian bees and queens, as a Professor, who derived all his knowledge about this matter from half a dozen well marked pure queens and about half a dozen more of their daughters.

Hoping that these few lines may reach you safely, and that they may find room in the JOURNAL,

I am, yours,

A. GRIMM.

[For the American Bee Journal.]

Side-Opening Hives.

MR. EDITOR:—I noticed in the October number of the BEE JOURNAL an article by Novice about bee-hives, and as he is using a side-opening hive, and one in which the frames form the honey-board, I thought I would give my own experience with regard to that class of hives.

Three years ago wishing to Italianize my stock of bees, I concluded to try the movable comb-hive, and so made a few that year of the Quinby form of the Langstroth hive. Being satisfied that the movable comb or frame hive was the hive for the apiarian, I concluded to make no other. I had seen the American hive and was pleased with it. It seemed to me that the side-opening feature, and also the arrangement of the top of the frames to form the honey-board, might be adopted with advantage in the hive I was using. So last year all my hives were side-opening ones, using the same frames I had been using, but having strips of the proper width and thickness glued on their sides and so cut as to leave vacancies for the bees to pass through. I preferred gluing them on to increase the width of the top, because they could then be very easily taken off if desired. I had the impression which others have, that the honey-board was superfluous, giving the bees the air-space and the thickness of the board, as so much extra distance to travel.

I watched the two forms of hive closely, and could not see that there was any difference in the amount of honey stored in the boxes; while the disadvantages of the solid top frames were so obvious, that the fifty hives made this year were all made with honey-boards, and also the strips taken off the frames of last year's hives and the additional height necessary for the air-space put to them, and honey-boards made for them also. I found that it was so much trouble to take off the boxes, and so many bees were killed in putting them back, that I always disliked opening those hives. When there were no boxes on the hives, they could be opened rather than the other form of hive. But with the honey-board it makes no difference whether there are boxes on the hive or not, save the increased weight of the honey-board.

The side-opening arrangement of last year's hives is retained; but I have scarcely used it all this year. Occasionally a swarm will build

combs so irregularly that it is an advantage to have a side-opening hive. But there are so few such cases that I have not made any more side-opening hives, and probably never shall.

And now I would like to ask a question. What is the best height for the movable comb hive where bees are wintered in-doors? Mr. Langstroth's hives, I believe, are nine inches high. Mr. Quinby makes the Langstroth hive twelve and one-half inches high. Mr. Otis and others claim that bees will store more honey in boxes in the shallow hive used by Mr. Langstroth, than in the higher one recommended by Mr. Quinby. In the plan now adopted by myself as well as others, of putting empty boxes under those nearly full, I am not sure but that the shallow hive is the best; and I have pretty much decided to adopt that form in the future. I am aware that it is inconvenient to have two sizes of frame in the same apiary; but if bees will store more honey in the shallow form of hive, I am willing to risk the inconvenience, as I can look upon them and treat them as two separate apiaries, independent of each other.

L. C. FRANCIS.

SPRINGFIELD, ILL.

[For the American Bee Journal.]

Italianizing Colonies of Black Bees in Box Hives.

I find but little trouble in introducing Italian queens to black bees in box hives.

When the honey-gathering is not profuse, I select my time one-half hour before sunset, so as not to be troubled by robbers while the disturbed colony is not prepared for self-defence.

I capture two black queens of an evening. 1. I take a plain box the same dimensions of the width and breadth of the mouth of my hive. 2. I invert my hive, placing the box on the inverted hive. I blow some smoke of rags in the joints about the lid which is now down, then commence drumming on the hive with a small stick, and in ten minutes I remove my box and shake the bees out on a sheet spread near the hive, and capture the black queen. 3. I insert my caged queen between two flakes of honey-comb, containing young bees, if possible. It is all unnecessary to wait six hours before inserting her. I let her remain till the second evening, when I blow some smoke under the hive and again invert it; take my queen cage out and remove the cork, draw a piece of newspaper over the mouth of the cage, tying it fast around the cage with thread. I then daub the paper with honey, and perforate it with a few holes with the small blade of a pocket knife; then put the cage back to its proper place, invert the hive, and find all right nine times in ten.

Experience has taught me that if the caged queen is placed among the larvæ and eggs, the bees are not so apt to start royal cells.

I do not wish to be understood as recommending the box hive, but only to assist those who already have bees in them and are not prepared to transfer, and who wish to have Italian bees.

The Langstroth or movable comb hive in some form, is an almost indispensable requisite to every propagator of bees.

A. SALISBURY.

CAMARGO, ILL.

[For the American Bee Journal.]

Summer Feeding of Bees.

I moved my bees out of the cellar on the 9th of April last. On the 19th they had gathered considerable honey from maple sap. They had an abundance of brood in stages, and the Italians had drones hatching out. The spring was very cold and backward. On only a very few days in May could the bees come out of their hives. June proved to be nearly as bad. The bees had to draw on their old supplies, and a great many swarms in this section came near starving. From the 3d of June to the 15th, while the wild plums and wild apples were in bloom, they gathered somewhat more than they consumed. From the 15th of June to the 11th of July there was literally nothing for the black bees to get. Some swarms actually starved to death. On the 11th of July the sumac began to blossom, and lasted till the 24th, when the bees began to gather honey from the linden or basswood. From that time until the 6th of October, those swarms that were in a condition to do so, gathered abundance of honey. On the 9th and 10th of July, I examined some black stocks for my neighbors, and found no eggs nor brood in any stage in their hives. Of course such hives were not in a condition to store honey or raise surplus bees for increase this season.

During all this time, while the black bees were starving, the Italians were busy at work every day raising brood, and increasing very rapidly. (I have scattered white clover seed broadcast all around me, and it does first rate, so that I shall have that to keep me along next season.)

Some people say that it does not pay to feed bees. I know that it pays just as well to feed bees when they need it, as it does to feed anything else. Where I lived in Wisconsin for a number of years before white clover came into the country, I had to feed bees in the latter part of June and the early part of July. But then I had not the benefit of the basswood, for there was none within three miles of me.

I find that bees need feeding with me oftener in the summer to make it profitable, than at any other season of the year. For instance, just before basswood blossoms there is a scarcity of forage. The queen stops breeding, or if not altogether, she will to a certain extent, even if an abundance of sealed honey remains in the hive. Now, if you will give two table spoonful of very thin sweet, (even if it is made of the cheapest quality of sugar) to a swarm every evening for a week, you will have the cells well filled with brood when the honey season commences. On the other hand, suppose you do not stimulate by feeding, the honey season comes and the bees fill all the cells with honey in advance of the queen. The consequence is that you have a weak swarm of bees during the whole season. I am aware that this can be remedied to a certain extent in the movable comb hives, by taking out a full frame and inserting an empty one. But I have invariably found that fifty cents worth of sugar, fed at the right time and in the right manner, produced five dollars' worth of surplus bees or surplus

honey, (or in about that ratio) over and above what they would have done, if they had not been stimulated.

Of course this summer feeding is not necessary every year and in all localities. The inexperienced will say, how are we to know for certain when to feed, and when not to feed? When bees have gathered honey through the day, you will always hear a loud roar or hum in the evening, if you go near the entrance of their hive. If they have not gathered anything, all will be quiet and still. If you thus ascertain that they are gathering nothing for a number of days in succession, then feed of course.

Fall feeding is not profitable, because if bees have been properly managed through the summer, you will not have any stocks that need it. There are hundreds, yea thousands of people who never know that it is necessary to feed bees sometimes in the summer. But it certainly is. A hint to the wise is sufficient; but columns written to others on the subject would do no good.

ELISHA GALLUP.

OSAGE, IOWA.

[For the American Bee Journal.]

A Strange Occurrence.

Last spring I had a stock of bees in a frame hive. They were not very strong in numbers, but had a very fertile black queen, and the workers were common bees. They worked very well all summer, and stored some surplus box honey. On the 30th of October, I thought I would take out the combs and cut winter passages in them. I took them all out, looked them over, and cut the passages; but could find no eggs nor sealed brood, or in fact any brood at all. I then thought of course the stock had swarmed, and there was a young unfertile queen in the hive. So I looked the frames over to find the queen, and found her all right in the hive. I knew the queen as I had clipped her wings to prevent her from flying away with a swarm when I first hived them. She appeared to be all right, as lively and active as ever; but does not lay, and has not, I should think for some time. Now, if any one can give any reason why this queen does not lay, I would like to know it. She is but one year old.

F. W. D.

It is not unusual to find stocks without eggs or brood at the time mentioned. Italian queens commonly cease laying at an earlier period, but recommence depositing eggs sooner than black queens.

Sparrman has given us an amusing account of the honey-ratel (*Vicerra mellivora*) which has a particular instinct enabling it to discover bees, and attack them in their entrenchments. Near sunset the ratel will sit and hold one of his paws before his eyes, in order to get a distinct view of the object of his pursuit; and when, in consequence of his peering about in this manner he sees any bees flying, he knows that at this time of the day they are making for their habitations, whither he follows them and so attains his end.

[From the Country Gentleman.]

Fun Among the Bees.

MESSRS. EDITORS: One of my neighbor's boys in passing through my apiary, would take a stick and scrape off the bees clustered on the hive and then run. He wanted to have some fun, he said, when asked why he did it. It made the bees very cross, and I was in hopes that they would teach him a lesson and make him respect them. It is a long road that never turns, and one day they got their satisfaction in a somewhat novel and pleasing way. In passing through my yard one day with his New Foundland dog at his side, they stopped to look at a large swarm clustered on a hive. They were quite close up, when some fifty bees let loose and pitched in, which made the youngster hide quickly in some tall grass hard by. His dog, having more courage, was bound to fight it out, and bit, and snapped, and growled, right and left, until about a thousand bees came to the assistance of his friends, which made it so warm for the dog that he sought his kind master in haste. Strange to say, his master was angry with him, but the dog staid by him like a true friend, with hundreds of bees for company. The young chap, very soon tiring of his tormentors, went into the house and got under a table. Not stopping to close the door, his ever faithful and loving New Foundland followed with a good swarm of bees with him, and they all went under the table, which made it so warm for our friend that he hastened out of the house and made for home, followed by his loving friend and a small swarm of bees. It taught him a lesson that he did not forget, and should be a warning to other boys not to have fun with bees.—E. W. B.

[For the American Bee Journal.]

More Seeming Puzzles.

Mr. J. H. Thomas, of Brooklin, Canada West, gives a very good explanation about the two or more queens in one hive, so far as it goes; but it does not go far enough. I have had sixteen young queens in one hive at one time this summer. But to the point. I have something more for him.

On the first day of last April, I found a swarm in a hollow tree, and I brought them home without disturbing them. A few days after I tipped up the log, to look under and see how they were getting along, and in doing so the centre comb filled with brood and honey, fell down. I made a smoke of chips in an old tin pan, to smoke the bees so as to get them off the comb. I then inserted the comb in a frame and put it into another colony. On returning to look at my log, the smoke was issuing out of it in all directions. As the wind was blowing very brisk, a spark had caught in the rotten wood of the log. I took a pail of water and put out the fire, and in doing so wetted the bees considerably. I then split open the log and transferred the bees, comb, and all into a frame hive. While doing this, I found an old queen with one wing

and one leg gone. I put her with the bees. (I found her on the ground, where I had split open the log.) As it was a very strong stock and I had Italian drones, and the weather was too cold to raise queens in small boxes, I took out the queen on the third day after transferring, and behold, she was perfect, both wings and legs were all right! I supposed that when I examined her before, her wing and leg must have been stuck to her with honey or water. I destroyed her, and exchanged all the brood and eggs with my Italian stocks, so as to have the bees raise an Italian queen. (And here I will remark that I prefer exchanging brood in this way, instead of transferring my Italian queen from one swarm to another.) Five days after the exchange of comb, I examined the swarm to see if they had started any queens; but found that they had not. In three days more I examined them again, and was going to give them more Italian eggs, but found two queen-cells started close together, *and about one inch square of comb occupied with eggs!* Here was a poser. Where did these eggs come from? I proceeded to examine every comb carefully, to ascertain whether there was a queen present, and found the identical old grand mam with one wing and one leg gone! The other queen was a very fertile one, for there were large quantities of brood in the combs when I transferred them. So here was an instance of two queens in one hive all the winter, and both fertile. About one-third of the old queen's eggs hatched out drones in worker cells, and the remainder were workers. This accounts for my finding drones in this log, which I then supposed had lived all the winter. Perhaps the three other instances, which I mentioned in a former number of the BEE JOURNAL, in answer to Mr. Grimm, may also have been cases of this kind. Who knows?

I have spun this yarn out perhaps longer than necessary, but I wanted to give friend Thomas all the particulars. **ELISHA GALLUP.**

OSAGE, IOWA.

The newer, fresher, and cleaner the comb used for guides is, the more acceptable will it be to the bees. Darker and older comb, even such as has repeatedly contained brood, may indeed also be employed for guide-comb, though bees are apt to hesitate awhile before availing themselves of it. But old comb which has become friable from age, and may readily be crushed to powder with the fingers, must always be rejected. The bees would not use it, and when constrained to remove it by want of room in the hive, they would lose much precious time in the operation, and would most likely replace it with irregularly built comb.

Bees, in the formation of their cells, have to solve a problem which would puzzle some geometers, namely, a quantity of wax being given to form of it similar and equal cells of a determinate capacity, but of the largest size in proportion to the quantity of matter employed, and disposed in such a manner as to occupy in the hive the least possible space.—Kirby.

[For the American Bee Journal]

Securing Straight Combs.

MR. EDITOR:—I see that Mr. Bickford in the JOURNAL No. 5, pp. 92 and 93, for November, 1867, has hit upon the *general idea* of what has proved with me as being the best plan to secure uniform straight combs. He says that his idea is "to place in the hive before hiving the swarm *two straight combs, one at each point where the curved combs usually begin, say at one-third of the width of the hive from each side.*" Of course I have no means of knowing where his bees *usually begin* to build *curved combs*, except from his article above referred to. My experience in former years, however, has proved to me that so far as my own and some of my neighbors' bees are concerned, they have never adopted as a rule of practice, any particular point within the hive, where it can be said that they "usually begin to build curved combs." I have had natural swarms to build combs very similar to Mr. Bickford's description. But, on the other hand, I have just as often had them build uniform straight combs on one side of the hive and curved, if not decidedly crooked ones on the other side, I have seen uniform straight combs on each side of the hive, and curved ones in the centre; others with uniform straight combs throughout the upper portion of the combs with curved lower ends. My experience has also convinced me that full colonies or swarms are more likely to construct uniform straight combs than light or small colonies or swarms are.

Let us now recur to the *general idea* of Mr. Bickford above—that is, the use of straight combs to be placed in the hive before hiving the swarm.

Straight combs, or combs that are *uniform in straightness*, so arranged or placed in the hive that the curvatures or irregularities in the several combs will correspond with each other, is the practice that I adopted in artificial swarming during the past summer. I have been using what is known as the "Harbison Improved Patent Hive," with nine frames in each hive; and by the loss of four colonies in the winter of 1866 and 1867, had at my command in April last, thirty-six spare combs to commence operations with. In April last, I cleaned, trimmed, and straightened these combs as well as I could—making them *uniform in thickness* and *uniform in straightness*. I was also careful in the use of these combs, in so arranging them in the hives as to leave any slight curvature in the combs used in each hive to correspond with each other. This I regard as being an essential precaution to be strictly watched and followed in practice, whenever dry combs are used as guides in the brooding apartment of the hive. A mistake or neglect in the strict and careful observance of this precaution may be, and from observation, I believe, has been the cause of bees starting and building short and irregular brood-combs attached to the sides of the full combs, in the interior of the hives—thus rendering the removal and handling of the full brood combs difficult and dangerous throughout the brooding and swarming season of the year.

What is necessary in the guide combs, is to

have full sheets of combs of a uniform thickness, and as straight as they can be made by first warming and then pressing them. Thus fitted out, if the operator shall carefully arrange the combs thus prepared, so that any slight curvature in the several combs used in each hive, will correspond with each other, the elements of success in securing the desired uniform straight combs will be under the control of the practical apiarian.

The next step to be taken is to use in each hive in which a natural swarm is hived, or an artificial swarm is placed, enough of these guides to insure the building by the swarm of new combs corresponding with the guide combs. The number of dry combs to be used in each hive, may be, and as I think ought to be, varied according to the size of the swarm and the size and shape of the hive in which they are put. For a small swarm in a full sized hive, I would like to have the use of from four to six guide combs, to be varied to suit the season—if early, four will do—if late, six will not be too many. For a full swarm, three or four will be sufficient—or even two, if early in the season. As to the particular place in the hive in which they should be set, I think it quite immaterial. I should not place them all together, either in the centre, or on either side of the hive. My practice has been so to arrange them in the central part of the hive as to leave one, and sometimes two, empty frames between them; and this arrangement secured for me, in each case, during the past summer, in all my young colonies (eighteen in number) uniform straight combs, corresponding in slight curves and thicknesses with the dry combs used in the several hives.

In each case when I used a comb full of honey, brood, &c., with a capped queen cell as a basis for a new colony, I selected the dry combs which were placed in the hive with it, corresponding in shape with the full comb thus used.

I am of the opinion that each full sheet of good sound brood comb is worth to the practical apiarian, who has in use movable comb hives, at least one dollar per pound for the purpose indicated above. To this may be added the help to his bees and profits in surplus honey.

Nov. 4, 1867.

BELMONT.

The indefatigable hive-bee as she flies from flower to flower, amuses the observer with her hum, which, though monotonous, pleases by exciting the idea of happy industry, that whiles the toils of labor with a song. When she alights upon a flower, and is engaged in collecting its sweets, her hum ceases, but it is resumed again the moment that she leaves it.

The majority of insects, either imbibing their food in a liquid state, or feeding on succulent substances, require no aqueous fluid for diluting it. Water, however, is essential to bees, ants, and some other tribes, which drink it with avidity.

In the Ukraine some of the peasants have 400 or 500 bee-hives, and make more profit of their bees than of their corn.

[From the (Albany) Country Gentleman.]

Egyptian Bees.

As several have lately made inquiry about the Egyptian bee in your columns, I will, for their gratification, give the facts I am in possession of. Early in 1866, Rev. L. L. Langstroth honored me by consigning to my care some Egyptian queens he had ordered from the Berlin Acclimatization Society. It so happened that on their arrival Mr. L. was in New York, and took charge of them. They arrived in fair condition; but I do not know what success he had in propagating from them. The first week in September last, I had more consigned to me for Mr. Langstroth, and they arrived in perfect condition. On the 28th, I received two nuclei on my own account, and have been successful in introducing queens. I will rear a few queens this season to test their progeny. Mr. W. W. Cary, of Coleraine, Mass., has an interest in this importation, and he has assisted me in their management. I mention this fact as it will give confidence to all who know his high reputation, that every exertion will be made to breed them in purity, which will be done in an apiary five miles from his Italian stock. Mr. Cary's success in breeding Italians pure is owing to his great care, and very favorable location—his large and constant sales to other breeders show their high appreciation of his stock.

I can only write of the appearance of the Egyptians, having had but little experience with them. They are smaller than the Italian, but of similar markings. The workers have a yellow spot on the back, partially masked by hair, but brilliant when the hair is wet and laid. Their abdominal rings being fringed with white hair, and the black being more glossy, gives stronger contrast of color, and I think, would be pronounced by all more beautiful than the Italian. The drones are handsome, the posterior portion of the abdomen being heavily fringed. I have seen some Italian queens handsomer than the Egyptian queens I now have, but reserve my opinion until I have seen more of them. As to Mrs. Tupper's test of an Italian queen's purity, "duplicating herself" in her queen progeny, I have no faith in it, for every close observer knows that the native black queens vary very much in size and color, where there was no possibility of any admixture of foreign blood; and we have yet to learn how much may be done by careful selection of queens for breeding. I have a few live specimens and some in alcohol, now on exhibition at the fair of the American Institute.

European writers describe the Egyptian bee as being less docile than the Italian, which may be owing to not fully understanding their habits and how to handle them. Prof. Vogel, who has had the largest experience with them, finds no difficulty, and I apprehend none. Their industry and fertility, and all other points, can be fully tested next season. No one can fail to be charmed with their beauty.—*Ehrick Parmly, New York.*

For the American Bee Journal.

Building Combs and Storing Honey.

EDITOR JOURNAL:—Bees will commence at the base of frames of a certain size to construct combs. About the middle of July last, I put on my hives a number of boxes containing each fourteen frames, each nine inches deep, with the top slat provided with the usual triangular strip, but without any guide-combs, nor did I rub them with beeswax. The result was that in four-fifths of these boxes, thus put on for surplus honey, the combs were built from the bottom upwards, in the usual shape, with the exception that the combs thus built were from two to three inches thick and very irregular.

Another class of frames was six and a half inches deep, but precisely similar in all other respects. All of these contained good-shaped combs, built in the usual way. Now, as I am a subscriber for your most valuable JOURNAL, and have perused its pages in vain for something on the subject, giving the experience of others, I have been led to try a number of experiments, and have come to the conclusion that more surplus honey can be obtained by the use of a set of shallow frames than can be obtained in the same length of time, from a hive arranged with a crown board on which four or six small boxes are placed. And for this reason: the crown-board has a tendency to confine the animal heat too much to the bee-chamber below. Bees require a certain amount of animal heat to enable them to build comb after the wax has been secreted in the rings of the abdomen, and there is a deficiency of this heat in the surplus boxes thus placed.

I have used the Langstroth movable comb hive for several years, and found that though with the crown-board and small box arrangement, I had very populous colonies with the bee-chamber well-stored with the precious nectar, still from some unknown cause, the bees frequently failed to store surplus honey in the top boxes. I am aware it will be said that some of the requisite conditions were wanting. I have not been without bees for the last sixteen years, and for some seven years past, I have been a tolerably close observer; and if any of the needed conditions were wanting, I have not been able to discover it.

The best mode of securing surplus honey should engross the attention of the bee-keeping public. I would not be understood as discouraging the propagation of the Italian and other varieties of the honey bee, the multiplication of colonies, &c. That is all right and proper, and just as it should be, for very much depends on it. It is in fact one of the essential elements of success. The principles of apiculture have been as well defined as they could be; but the practice is still in its infancy, at least in the western and northwestern States.

JAMES McMULLEN.

OSKALOOSA, IOWA.

The construction of the combs of a bee-hive is a miracle which overwhelms our faculties.

KIRBY.

[For the American Bee Journal.]

Voluntary Contractility of the Queen Bee at Oviposition.

MR. EDITOR:—It is to be greatly lamented that the skillful fisherman, Dzierzon, has hauled the biggest fishes from the mellifluous river of Beedom. Yet we need not wonder at his success when we consider that his "great big" bait, seasoned with the penetrating genetic flavor of teutonic scrutiny, has made it impossible for the numerous shoals of minnows and other small fry to get a tenable bite upon it. Occasionally a good-sized sucker makes a "glorious nibble," and holds on to it till it appears a considerable distance above the water, when whap! plumb it tumbles down again, and vanishing affrighted below the surface, leaves nothing very notable behind it, but a dashing splash and momentary ripple. While fragmentary remains of this unwieldy bait still tantalize the hungry voracity of the small fry below the opaque surface of this mystic river, the *frogmental dash* of impurity in Italian bees on shore, in a similar manner still baffles the hungry imagination of every theoretic apiarian.

Various, and to all appearance, very plausible theories have repeatedly been presented to explain the origin of this objectionable dash, and inasmuch as in these dashing *latter days*, dashing objections are levelled against the well-established *Dzierzon theory*, I feel constrained also to dash down my views upon this interesting subject, not so much with the intention to instruct the reader as to show him that, like the good-sized sucker above alluded to, I have a pretty good hold upon the bait and expect to be hauled above water, not caring whether I will tumble down again or not, for an ablation now and then hurts nobody. If I should be doomed to sink, may my body rest in peace with Dzierzon.

Taking Dzierzon's whole theory of reproduction in bees, as deduced from the hypothesis that *in copulation the ovaries of the queen are not fecundated*, to be correct, it must be easily perceived that all the eggs in both sections of the ovary remain drone eggs before they glide past the mouth of the spermatheca filled with the drone's semen. The question now naturally arises: How, then, if all the eggs must glide past the mouth of the spermatheca, does it happen that some eggs develop into drones, some into workers, and some into queens?

Dzierzon, indeed, tells us that the queen has it in her power to deposite an egg just as it comes from the ovary, as drone-laying mothers lay it, or by the action of the spermatheca past which it must glide, to invest it with a *higher potency of fertility*, &c., and that she does so instinctively, induced by the *width of the cell to be furnished*. But he does not attempt to say *how this is done*. The link is wanting here, and the difficulty of knowing *how this is done*, does not, I think, require us to ransack nature for analogy to solve the difficulty to supply this link. No, Mr. Editor, how ingenious Mr. Wagner's theory upon the subject may at first appear to the majority of readers, it is open to two very serious objections.

First, It directly contravenes proposition third of Dzierzon's theory, as set forth in the celebrated Apistical Letters of the Baron of Berlepsch, which definitely states that "the queen possesses the *ability* to lay male or female eggs *at pleasure*, as the particular cell she is at any time supplying may require." *Second*, It leaves unexplained the well-known fact that the queen *does* lay eggs in cells not more than one-eighth of an inch high, when and where, of course, no involuntary compression can take place.

Viewed from the standpoint of the first objection, it denies *voluntability* to the queen; whereas, viewed from the standpoint of the second objection, this voluntability the queen visibly inflicts upon. The fact that Mr. Quinby comes to the assistance with his "*may be*," that, just at the moment of the passage of the egg, or the act of laying, the contents of the abdomen are crowded downward, and it enlarges sufficiently to touch the sides of a cell only one-eighth of an inch deep, only casts the will of the queen upon contingencies; whereas, these prove only the exception to the general rule of the queen's manner of ovipositing. As if aware of the insufficiency of his supposition, Mr. Quinby advances an argument of his own, which, instead of throwing light upon Mr. Wagner's theory, only throws the veil of lurid offuscation around his argument. He adds: "When I first saw the smallest queen that I ever raised, *whose body was even smaller than a worker's*, it occurred to me at once that if she ever laid, it would be a test of the principle. Her body being small, it could not, of course, be compressed like others, and a large portion of her progeny would prove to be drones in worker cells. The result was just what I expected—*one-half were drones*." And here, Mr. Editor, with due deference to Mr. Wagner's theory and Mr. Quinby's writings, permit me to state that, in my opinion, if there ever was such a queen, not only *has* but *all* her progeny must have been drones in worker cells, since "the terminal point of the drone's abdomen is inserted in the sheath of the queen's vagina before the extrusion and inversion occur—thus affording the terminal section with its horns, the middle section, and the bulb containing the spermatophore, time to assume their proper relative position within the cavity of the vagina," it were, I should think, altogether impossible that the male genitalia, if they could pass the external orifice of a queen even smaller than a worker, should find room to intrude and invert in the vagina of such a diminutive queen. Now, if reasoning in the language of men, whose reputation for learning and skill in entomotomistical demonstrations is unquestioned, be not purposely sophistic, I would like to be told where the *test to establish this principle* of involuntary compression in the empiric statement of Mr. Quinby is to be looked for.

Nor is it necessary to entertain Mr. Harbison's incongruous views in explaining the impregnation or rather fertilization of the queen's eggs. Mr. Harbison, it is true, admits that the queen exercises certain knowledge, will, or understanding in her manner of depositing eggs. But, instead of endeavoring to give birth to an entirely new and unobjectionable theory, by murdering

an old one he has involved himself in a maze altogether inextricable.

He contents himself with believing that a sufficient portion of the seminal fluid to cause the egg to generate is incorporated with it in its formation; that one of the ovaries will produce drones, and the other workers; that the anomaly of drone-laying queens arises from the imperfect development of that part of the ovaries which produces eggs for workers; that the queen has, indeed, a seminal sac, although anatomists have repeatedly demonstrated that this sac is surrounded by "a muscular tissue, by the contraction of which compression is effected and the contents forced out through the discharge pipe into the oviduct." And yet Mr. H. does not believe that the queen has a full control over the outlets of the bilateral oviducts, of which no anatomist has ever, to my knowledge, intimated that they were capable of either muscular contraction or compression. What a monumental faith the originator of such a theory as this must have possessed? And were it not for the above-mentioned second objection he has raised against Mr. Wagner's theory, we might, without compunction, have passed him by with a most benignant apianian smile.

Now, it need not be denied that all motion and locomotion in animated nature depends directly upon the will in each individual creature, as much as the free exercise of the will in each individuality upon certain instinct or reason, to account for the ability of the queen to lay her eggs in either drone or worker-cells at pleasure. For I cannot discover the least propriety, necessity, or adaptability of means to end in denying the queen her legitimate instinctive power—voluntary contractility.

If, however, it be said that the point at issue—the movement of the muscles comes under the head of organic contractility, I reply that organic contractility in the point at issue, is directly depending upon the will of the queen also, and that that apparent encroachment of will upon organic movement is the very link which has so long and so sedulously been sought after.

How, then, is the fertilization of the queen's eggs effected? It is an undeniable truth, that in animated nature, respiration as well as the call of nature, can, in a measure, be suspended at will. The former we suspend at every act of swallowing, and the latter we may suspend at every act of voiding. Now, it requires no great stretch of thought to believe that by the sense of feeling, the queen in the act of ovipositing exactly knows when an egg reaches the proximity of the spermatheca, and that by the sense of seeing she is equally well enabled to distinguish a drone cell from a worker cell. If, then, it be her pleasure to supply a drone cell, she applies a little voluntary contractility, closes the discharge-pipe of the spermatheca, and allows the egg, just as it comes from the egg-bed, to glide past it into the cell, where, as all admit, it will develop into a drone. On the contrary, should she please to supply a worker cell, she causes the egg not to glide past the spermatheca, but directly before its discharge-pipe, when, by the repetitious acts of voluntary contractility and recidivation, she fertilizes this egg and all succeeding ones to be

laid in similar cells, with more or less seminal filaments, according to the more or less perfect conformation and fulness of her spermatheca, and the more or less complete control she has over the muscular net-work surrounding the same. All eggs thus fertilized become worker eggs, and when deposited into worker cells, are developed into workers or queens, just as the good people of the hive then may will it.

The link is inserted. In my opinion, it fills the theoretic vacuity of Dzierzon's theory.

In order, therefore, to give the objector to this theory time to collect and arrange his arguments against it, I may say that by it we can account for the origin and multiform appearance of the fragmental dash of impurity in Italian bees, without the assistance of either Mr. Kirby's "smashed up drones" theory, or Mr. Thomas' theory of absorption and circulation, and thus proceed to state the indisputable fact that there are to be found in Italy, as well as in Switzerland and Germany, bees of the common variety.

That some black bees there as well as here and elsewhere, do make at times their appearance simultaneously with three-banded, two-banded, and one-banded bees in one and the same hive, need not here be denied by either Prof. Mona, Mr. Uhle, or Mr. Grimm. For it just so happens that I am acquainted from my youth up with a gentleman not far off, who raises no queens for sale, who is reliable and who claims "to be qualified to form an opinion respecting Italian bees" also, and who, likewise, (I can sustain the allegation myself) has seen Italian bees in their native clime a long while before either Mr. Uhle or Mr. Grimm had wound their way over the Alps. The trouble with which Italian bees in Italy might be purified from any objectionable impurity, would be, comparatively speaking, nothing. But please, sir, without imputing any motives of deception or dishonesty to any person, to recollect that scientific bee-culture in Italy is of quite recent date, and comparatively speaking, nothing either.

Now, if I may be permitted to state the fact that strolling dealers in Italian bees and perambulating agents of foreign exporters, in order to obtain the wished-for number of queens, are compelled to buy their bees for many miles around their respective bee depots from peasants, who, ignorant as a class to such a degree, that in order to disprove the fact of the queen's laying eggs at all, they could at best quote Anthony Conova's treatise on bees, and say with him they don't believe it because they have never discovered any egg shells on the bottom board or before the hive, it must be evident to the least reflecting that this much complained of fragmental dash of impurity is not at once and altogether eradicated by the simple act of purchase and exportation.

Will not Prof. Lewis Bonner and the other semi-Italian gentleman who bought up thirty stocks of Italian bees for Mr. Parsons, of Flushing, in 1859-60, give me a lift "in the rear?" I assure them that although this peculiarly convenient locality be not at all "protected by an ample application of Prof. Flander's celebrated bee-charm," they need not fear to be stung by either American or imported "high-breds." I know it.

Therefore, unless imported Italian queens were raised in Italy, Germany, or Switzerland, and tested with a view to *impeccability of temper and distinctive coloring there likewise*; and unless after importation, the owner of such confine his exclusive attention to rearing and testing a manageable number of daughters to be purified and kept pure by an established criterion, the purchaser may find that his black-streaked and ring-speckled pure Italian queen will produce workers that can stand no test of purity whatever.

In regard to the remarks of Mr. Thomas upon my Impeccability of Temper, I have, therefore, at this time nothing to say, further than that in Europe, my test constitutes the rule and not the exception with Italian bees; and that were it not for this fact, I should not have dared to advance it as a reliable test of purity in America. Hence I must again insist that if it be at all desirable to obtain bees possessing this admirable trait, the honest breeder of Italian queens (without disposing of his *Lowe*-bred drones), should test his workers upon the scale of impeccability.

Mr. Thomas, in my opinion, reasons very cogently. I congratulate him upon what he has advanced, and if the stubborn facts above alluded to can be *rocked to sleep*, and the positiveness of his conclusions thus be converted into truths, I shall be ready to *accept and acknowledge* them of course. If truth has suffered on my side, I stand ready at any moment to retract.

I would also beg your leave, Mr. Editor, to inform Mr. Thomas, in conjunction with what precedes, that I will not *sell* him any queen at any price; but if he thinks that my impeccability of temper is worthy of preservation, he may give me a friendly call in person, whenever it may please him, with the express purpose of examining my limited number of Italian stocks, and then, if he can find any one of them "that will not sting him," he may take it queen along, as Prof. Alsatus would say, "*free gratis for nothing at all, except a puff or two in his county paper.*"

If this affectionate tender of generosity does not characterize me in the estimation of Mr. Thomas as a most singularly true and careful bee-raiser, I would not risk to send him the *Italian fly*; for how can I know that my most precious effluvia and impeccability of temper is applicable to his psychical temperament and physical constitution.

In conclusion, permit me to remark that I am neither a professional physiologist or anatomist; that microscopic observation, however serviceable in demonstrating lifeless organism, may still fail to assign its appropriate office to the "wheel within the wheel" in animate nature; and that there exists on either side of the lens, organic animation which can never be brought within its scope.

With many respects to all, I remain,
Prof. F. VARRO.
WASHINGTON, PA., Nov. 13, 1867.

"A bee," says Dr. Paley, "amongst the flowers in spring, when it is occupied without intermission in collecting pollen for its young or honey for its associates, is one of the cheerfulest objects that can be looked upon. Its life appears to be all enjoyment—so busy and so pleased.

[From the Steubenville Herald.]

Profit of Italian Bees.

MR. EDITOR: Having but four Italian colonies to commence with at the commencement of summer, three of which were pure and one hybrid, and using the three that were genuine to rear queens to supply my apiary, it was impossible for me to form a correct estimate of their capacity to store honey when left alone, as compared with the black bee. But the following statement of the product of a single colony in the apiary of T. L. McLean, which came under my observation, and for the truth of which I appeal to Mr. McLean himself, seems to confirm what has already been asserted, that they will accumulate in the same locality twice the amount of honey that the black bee will. At the commencement of spring Mr. T. L. McLean's apiary consisted of one Italian colony with some seventeen black colonies. On the 27th of May his Italian colony swarmed, beating his black bees two or three weeks and was done swarming before they commenced. It sent off three swarms, and in sixteen days the first swarm swarmed. This swarm with the rest, filled good-sized boxes to the bottom, and together with the parent hive, stored eighty pounds of surplus honey. Now the least figure that an Italian colony sells at in the common box hive, at any place where they are sold, that I know of, is twenty dollars. At this price the swarms themselves would amount to eighty dollars, and eighty pounds of surplus honey at twenty-five cents a pound would amount to twenty dollars. This, with the price of the swarms, will foot up the snug little sum of one hundred dollars profit on a single colony of Italian bees. For information concerning the superiority of the Italian bee over our common kind, as also, the best method of its safe introduction into black colonies, I would refer your readers to the AMERICAN BEE JOURNAL, published monthly, at two dollars a year, by Samuel Wagner, Washington, D. C. This journal is a medium through which practical bee-keepers communicate their experience, and its editor is one of the most theoretical as well as practical bee-keepers in this country. To those who are pursuing bee culture for profit, this journal is of inestimable value.

JOHN L. McLEAN.

RICHMOND, OHIO.

The cells of the combs as built by the bees have all a slight inclination upwards, the better to retain the honey stored in them in its liquid state. In attaching guide-combs to the frames care must therefore be taken, especially when broad pieces of comb are employed, to give these the proper adjustment—that is, to preserve the upward inclination of the cells in each piece. This will greatly facilitate the further extension of the combs by the bees. The bees will indeed use combs improperly adjusted in this particular, though with some reluctance evidently; and there is always more or less tendency to irregularity.

Send us names of bee-keepers with their post office address.

THE AMERICAN BEE JOURNAL.

WASHINGTON, DECEMBER, 1867.

THE AMERICAN BEE JOURNAL is now published monthly, in the City of Washington, (D. C.,) at \$2 per annum. All communications should be addressed to the Editor, at that place.

Our present supply being exhausted, we cannot furnish new subscribers with copies of Nos. 1, 2, and 3, volume 3, of the BEE JOURNAL. We shall have those numbers reprinted at an early day, and send to those who have ordered them.

Want of room and time compels us to defer the publication of several articles intended for this number of the BEE JOURNAL. Communications should be in our hands before the 15th of the month, to enable us to avail ourselves of them conveniently for the next succeeding issue, as we desire to have the BEE JOURNAL published regularly at the beginning of each month.

We received lately from a correspondent in West Virginia, a specimen of a plant known there by the trivial names of Iron or Brush weed, and which is said to be "an important honey plant" in that section—coming into bloom about the first of September and continuing until frost; the honey gathered from it being of good quality.

We submitted the specimen to Prof. Porter, who says it is "the *Aster ericoides*, L., which is exceedingly common along roadsides and in neglected pastures. I have never seen bees working much upon it, and greatly question its honey-bearing qualities. But there is one *Aster* which richly deserves attention in this respect. It is often cultivated as an ornamental plant, and produces a great profusion of reddish purple flower-heads of large size late in autumn; and I have frequently noticed bees working most diligently upon them, when nearly everything else had yielded to the blighting influence of the frost. It is a perennial and will grow well in ordinary mould. It is the *Aster Novæ Angliæ*, or New England *Aster*."

The following note respecting the *breathing test*, was received from Mr. Root just as this number of the JOURNAL was going to press:

"Perhaps it is due to the readers of the JOURNAL to state that the Breathing Test, described in the September number, does not answer in

cold or cool weather.

"When the article was written I had not seen a failure. But since in trying them in cool weather, they manifest considerable excitement, especially if tried suddenly. However, I have never yet had the full bloods sting me at such times, although they act very much as if they would. Still there is a marked difference in their behavior from the hybrid bees.

"I should have made this statement sooner, but awaited the result from others.

"MEDINA, OHIO.

"A. I. ROOT."

[For the American Bee Journal.]

Fixed Frames.

MR. EDITOR:—I noticed in the October number of the JOURNAL an article on bee-hives, in which the writer says he cannot see the objection to keeping the frames all fixed at equal distances. Now, as I am only a beginner myself, I should perhaps not say much; but as facts have a value far above theory, I will state my objections to such frames.

In the first place, if frames with closed tops are used, the bees will glue them to each other with propolis their whole length, so as to make it very difficult to open a hive, especially in cool weather, which hardens the propolis and makes it adhere very firmly to the frames. In prying them apart you cannot then avoid jarring the combs, which greatly enrages the bees; whereas in the Langstroth hive, the operation is performed without any jarring whatever.

Again, when you come to shut the hive, you cannot avoid pinching and crushing bees, in swinging or shoving the tops together, which of course also irritates the colony. But in the Langstroth hive, where the frames are separate throughout, there is no danger of killing a single bee. Nor, as no two combs are built just alike, can you conveniently change combs from hive to hive, as is readily done where the Langstroth hive is used. In hives having frames with closed tops, every frame has to come to a certain place, allowing no chance for adjusting waving or bulging combs; while in the Langstroth hive you can make ample room for any comb, however waving it may be.

Again, suppose you want to examine a comb in the middle or back part of the hive, you have to move every frame till you come to it, whether there be one or a dozen; whereas in the Langstroth hive, such an operation is quickly and easily performed.

I have been using the last-named hive for two seasons, and think it incomparably superior to any other with which I am acquainted. Hoping I have made my objection to the kind of frames referred, sufficiently plain and intelligible, I will stop.

Yours respectfully,
EVANSBURG, PA.

H. S. S.

The hive-bee sometimes manifests an antipathy to particular individuals, whom it attacks and wounds without provocation.

[For the American Bee Journal.]

Experience of a Novice.—No. 8.

Before we start in pursuit of "giantess" and her retinue, perhaps I might remark that I forthwith looked up all my remaining fertile queens and clipped one wing of each, (clipping a leg I have decided to be unnecessary). After having thus made all the rest safe, I took up the pursuit.

It was towards evening as I started off across the meadows, and the air was filled with perfume from the many blossoms which have always possessed a double charm for me since I have made bees a study, although they were fascinating before. As I passed a piece of rising ground the sound of humming bees seemed to fill the air with a continuous roar, as though it were full of them, although none could be seen. It was some time before I could understand it, until I came to the conclusion that it was occasioned by the bees from town passing to and fro from the acres of snow-white clover, which seemed to increase as I passed further on. I had been looking for Italians, and had noticed them occasionally at work until I got about a mile from my apiary, where they almost ceased to appear, although black bees were in great plenty. Half a mile further on, as I neared a piece of woods in a direct line in which my swarm had flown, I found the clover blossoms almost exclusively covered with hybrids. The clover was so plenty about there as to present almost a perfect mass of white blossoms. And on going home in a different direction, I found the hybrids gave place to black bees at about such a distance, thus settling the question that the truant swarm was in that vicinity.

Perhaps I should have remarked that I had previously examined my books, and found that Langstroth mentions a similar case of bees going off without clustering, and that they were found by taking the line on which they were last seen to move.

In this case I had taken the direction by climbing to the top of the house and noticing where they would strike the forest in passing over the house of the friend before-mentioned. As I had seen them at work, if I had not found their precise location, I returned home well satisfied with the progress made and my walk.

In a few days I again visited the locality with bee-box and honey, in order to line them as per directions in Bee-Keeper's Text Book. But though I caught a number, they did not seem to care for honey, and would not notice it even when I poked their noses into it. They had evidently made up their minds not to be *lined*.

On further consultation of the Text Book, I learned that I must wait until forage was not so plenty. I did so, but as I waited until the white clover was all gone, I could not find any bees to start with; and after several unsuccessful attempts, concluded that "bee hunting" was not my *forte*. I was going to abandon them in despair, when in August we discovered Italians at work in a buckwheat field near there. Bringing the bee-box again into requisition, we soon had a line in

the desired direction, and presently a host of bees going and coming on a "bee-line." However, they did not all strike the woods at the same point, and after looking in vain at all the trees within a quarter of a mile, we decided to "cross line."

We had left the Text Book at home this time, but thought we remembered the directions. Catching a boxful of bees and carrying them about a quarter of a mile, we let one out to see which way he would go dome. After circling around some time, he struck off northeast. Thinking we had not come far enough, we went another quarter of a mile and let out some more. They moved northeast also. Well, we reasoned, bees of course know which way home is, and we will take them far enough, so that they will have to come back. So we tried half a mile. Still northeast. Another quarter of a mile, and on letting the balance out, as they too settled in a northeast direction, my companion (who only weighs 240 pounds avoirdupois,) declined going further, as he was sure they had located somewhere on the opposite shore of Lake Erie.

Home again. Some of our acquaintances shook their heads, remarking what a crazy fellow that ——— was, chasing after a swarm of bees, *they* knowing all the time he would never find them. They (the bees) had been advertised in the *Gazette* when they first went off, so that everybody knew about it.

But *we* were going to have them just for spite—see if we didn't.

We engaged the services of an experienced bee-hunter, and prepared anew for the siege. Being reinforced with a bottle of oil of anise according to his direction, we soon had half a swarm at work, and whilst we amused ourselves in carrying the bait along in the direction from which they came, he went to examine a piece of woods beyond those in which we had been looking when they first went into the trees. It was not long before we heard the welcome news that he had "found them."

Swinging our hats with loud huzzas for our success, we approached the tree. Sure enough, we found them in the top of a towering oak, going in and out as much at home as if they had a perfect right to be there.

In going from the buckwheat field they had been compelled to pass a small corner of woods, and as some had gone over it and others around it, it had created the confusion in regard to their locality.

A suggestion from any of our readers as to how we can get "giantess" down without damage to her majesty, would be esteemed a rare favor by
NOVICE.

P. S.—As we propose leaving her till spring, there will be ample time for hints on the subject.

The economy of a nest of *wasps* differs from that of the *bees*, in that the eggs are laid not by a single mother or queen, but by several; and that these mothers take the same care as the workers in feeding the young grubs.

Send us names of bee-keepers with their post office address.

[For the American Bee Journal.]

Patent Hives.

Mr. Langstroth somewhere in his valuable work on "The Hive and Honey Bee," (a note at the foot of page 61, third edition, I believe,) cautions persons purchasing patent rights "to be careful to find out just what is covered by the patent device, which they are careful to conceal, while they are loud in their praise of other parts which any one has a right to use." He might add—"or which in some cases are covered by patents of other parties."

Acting under this advice, I determined this spring to write to a widely known Western firm, engaged in vending a patent hive, which they claim to be ahead of anything yet out, and ask them to forward me a copy of the claims under their patent.

They replied that they had no printed copies of their claims, not having time to prepare them, and were too busy to make a written copy; but in the fall would have some printed and send me one; (which I have not yet received) and wound up by advising me to get their "book and be satisfied, as all the points chiefly dwelt on, are covered by the patent."

Now it happens that I *had* read their book, and this was my very reason for writing to them, as I was not *satisfied* by any means. The points that seemed to me "chiefly dwelt on" were—

1st. *Movable frames.* As they could not possibly claim these, we will say nothing more about them.

2d. *Upright form of hive.* Now as upright hives seem, from all accounts, to have been used as long as bees have been domesticated, we *suppose* they do not claim this.

3d. *Side-opening.* German apiarians have used this feature for upwards of thirty years, and Mr. Langstroth tested it before he fixed on hives with a movable cover, as the most desirable form; (see October number of the BEE JOURNAL); and however loose the workings of the Patent Office may be, a patent would hardly be granted on so old an invention.

4th. *The use of two boxes for surplus honey, one above the other,* to induce the bees to work more readily in empty boxes after full ones are removed. This is an idea of Mr. Quinby's, published by him (Mr. Q.) long since.

5th. *The hive being weather proof.* This is a most absurd thing to claim, for almost any hive, if well made, would be so.

6th. *The arrangement for ventilation and nucleus swarming.* This may be patented, but how are we to know?

7th. *The entrance regulator.* If this is covered, it is certainly not worth much to any one owning the Langstroth right, as it is much more complicated, and we think less useful than the triangular blocks.

There are several other points "dwelt on," but as we have already written more than are intended, they must remain unnoticed.

You may judge from the above how near a man can *guess* at what he pays his money for. Yet, strange to say, from certificates of Express agents and postmasters, published by the firm,

it would seem that they find plenty of customers. We would like to know if any of them were furnished with more reliable information than that with which we were expected to be *satisfied*.

The plea that they had not time to prepare copies of the claims under their patent, is hardly credible, when we see the quantities of circulars, pamphlets, &c., which they distribute throughout the country. It is assuredly part of a man's business to inform his customers what they are buying from him. Mr. Langstroth, whose health is very poor, and who has as much business as any apiarian, still manages to find time to prepare copies of his claims, although he cannot write his new book, which all his friends are anxiously waiting for.

We have written this not from a wish to injure any one, but simply to warn bee-keepers against purchasing rights from *any one* without first knowing precisely what those rights are. If any one feels aggrieved by our remarks, we shall be most happy to have him answer us through the medium of the BEE JOURNAL, so that its readers can understand the merits of the case.

D. M. WORTHINGTON.

ELK RIDGE, MD., Nov. 8, 1867.

P. S.—I have no interest in any patent, save an individual right in the Langstroth hive.

D. M. W.

Preservation of Empty Combs.

New, clean, and straight empty combs are of great importance and value in bee-culture, where movable frames are used, and should be carefully secured from the attacks of vermin and insects. Mice and the bacon beetle, (*Dermestes lardarius*) though not wont to devour them, are yet prone to gnaw and damage them. The most formidable enemy against which we have to guard is the larva of the wax-moth. If once in possession of a comb, these nauseous worms multiply rapidly, and subsisting on the wax, soon reduce the whole to a filthy mass of web-entangled excrement. Combs which have never contained brood and are free from pollen or bee-bread, are not so liable to be attacked by the wax-worm, as brood comb long used and stored with pollen.

Empty combs should be suspended separately in an airy upper chamber, and frequently inspected. A mere glance usually suffices to detect the presence of larvæ in these combs, and if taken in hand immediately the grubs may easily be removed without injury to the comb by inserting a splinter of wood in the cell infested, twirling it around a few times, and then withdrawing it with the worm and its web. Repeated examination, however, is necessary, because the cells may contain eggs, which do not all hatch simultaneously, but disclose from time to time, as the state of the atmosphere around is more or less propitious. The most effectual preventive is to suspend the combs in a tight box, and exposing them there to the fumes of brimstone. They should be well aired again before given to the bees.